

REMARKS/ARGUMENTS

This is in response to the Office Action dated June 16, 2005.

The drawing figures are objected to because on Fig. 6, the arrow-head on number "54" is in the wrong direction. Applicants have corrected the drawing and enclose a corrected page showing the regeneration gas in the correct direction.

Claims 1-23 and 44-55 are rejected under 35 U.S.C. §112, second paragraph. Applicant is also amending several other claims to be consistent with those being amendment in response to these rejections under section 112. The amendments that have been made are explained as follows: Claim 1, line 13 has been corrected by insertion of the word "sector" in place of "portion" to be consistent with line 4 of claim 1. In claims 3, 4, 7, 9, and 13, "regenerating gas stream" is inserted in place of "regenerating gas flow" with antecedent basis provided in claim 1, line 9. In claims 5, 6, 8 and 9, "cooling stream" is inserted in place of "cooling gas flow". In claim 13, "compressing" is inserted in place of "compression", as found in claim 1, line 16. Claim 16, line 14 (page 33, line 1) is amended to insert "adsorption sector" in place of "adsorption portion". In claims 17 and 18, the word "stream" is deleted to be consistent with claim 16, line 6. In claim 20, "regenerating gas stream" is inserted in place of "regenerating gas flow with antecedent basis in claim 16, line 9. In claims 21 and 22, "cooling stream" is inserted in place of "cooling gas flow". In claim 44, line 6, "regeneration" is inserted in place of "second" to be consistent with the previous line within claim 44. In claims 46 and 47, "flow" has been deleted to be consistent with claim 44, line 5. Claim 48 is rewritten to state that "said gas feed stream is compressed by said gas compressor and then" is sent to an air separation plant. Claim 53 is amended to change "said compressed gas" to "said gas feed stream" which has antecedent basis in claim 43. The other cited claims should not be definite based upon the above recited amendments.

Claims 1, 2, 4, 9-13, 43-45 and 47-54 are rejected under 35 U.S.C. §102 (b) as being anticipated by both the rotary structure and its process of operation as shown by Izumo (US patent 4,946,479). The Izumo patent relates to a rotary adsorbent apparatus for removing solvents from air to prevent these solvents from being released into the atmosphere. Nowhere in the patent is it suggested that this apparatus could be used to produce a purified compressed gas stream as is produced and claimed in the present invention. There is only the disclosure of a blower 11 at the end of Izumo's purified air stream which is employed to handle any pressure drop across the damper to close off the system. All of the cited claims require compression of the purified gas stream which is outside the teachings of Izumo.

Claims 16-20, 22 and 23 are rejected under 35 U.S.C. §102 (b) as being anticipated by Macriss et al. (US patent 4,012,206). Macriss et al. teaches a process for air cleaning by removal of water and undesirable gases such as nitric oxide by use of an adsorbent body in the shape of a wheel. Applicants' claim 23 can be specifically distinguished from Macriss et al. in Applicants' compression of the air after it has been purified. In addition, claim 16

and all the claims that are dependent from claim 16 can be distinguished from Macriss et al. in that the present invention provides the capability to produce a dried gas stream containing less than 200 PPM of water. There is no suggestion in Macriss et al. that their apparatus would be capable of producing a dried gas stream containing less than 200 PPM water.

Claims 24-30, 32-34, 36 and 37 are rejected under 35 U.S.C. §102 (b) as being anticipated by Onitsuka et al.(US patent 5,158,582). The invention covered by this patent concerns the removal of NO_x from highway tunnels. Onitsuka et al. clearly distinguishes his process from other air purification applications. The reason that the inventor uses two wheels is to allow for the closed loop regeneration with ammonia which allows for the process to work without the need for strict control of the ammonia. The reference does not teach the use two wheels to produce first a partially purified gas and then a highly purified gas.

Claims 3, 5, and 46 are rejected under 35 U.S.C. §103(a) as being unpatentable over Izumo in view of Mestemaker et al. (US patent 5,628,819). The Examiner notes that these three claims differ from Izumo in the flow of regenerating gas being cocurrent to the flow of the feed gas stream. He cites Mestemaker et al for showing that regenerating gas can be passed through such an adsorber in the same direction as a feed gas and concludes that it would have been obvious to add Mestemaker's cocurrent regenerating gas to Izumo's disclosure. Applicants respectfully disagree. The Izumo patent relates to a rotary adsorbent apparatus for removing solvents from air to prevent these solvents from being released into the atmosphere. Nowhere in the patent is it suggested that this apparatus could be used to produce a purified compressed gas stream as is produced and claimed in the present invention.

Claims 7, 8, 14 and 15 are rejected under 35 U.S.C. §103(a) as being unpatentable over Izumo in view of Macriss et al. The Examiner has cited Macriss et al. for use of the regenerating gas and cooling gas stream as being purified gases that have passed through the adsorber. Applicants respectfully disagree. The Izumo patent relates to a rotary adsorbent apparatus for removing solvents from air to prevent these solvents from being released into the atmosphere. Nowhere in the patent is it suggested that this apparatus could be used to produce a purified compressed gas stream as is produced and claimed in the present invention.

Claim 21 is rejected under 35 U.S.C. §103(a) as being unpatentable over Macriss et al. in view of Mestemaker et al. Mestemaker et al. is cited for its teachings of the direction of the flow of the regenerating and feed gases. Applicants respectfully disagree based upon the failure of Macriss et al. to teach the capability to use such systems to dry product gases to the levels of the present invention wherein the gas is dried to less than 200 parts per million water content.

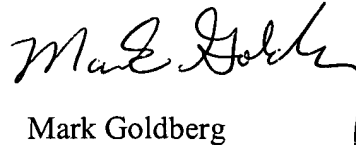
Claims 31, 35 and 38 are rejected under 35 U.S.C. §103(a) as being unpatentable over Onitsuka et al. in view of Suzuki et al. (US published patent application 2001/0009124). The Suzuki et al. application is cited for teaching multiple adsorbers and

combined with Onitsuka et al. as teaching an adsorption system having a third adsorber to further purify the feed gas stream. The Examiner has cited Suzuki et al. as showing four rotors. However, Applicants disagree with that interpretation. A review of figure 4 of the Suzuki patent clearly shows that there are interconnections of the piping sections (labeled as 130 and 150) which are attached to the upper and lower sections of a single rotor, specifically the dehumidifying rotor. Similarly, what the Examiner has interpreted as two rotors on the lower portion of figure 4 are the upper and lower piping sections of the decarbonating rotor. Accordingly, there are not more than two rotors shown by Suzuki and therefore the patent does not lead one to try more than two rotors. The purpose of the Suzuki invention is to use a rotor suitable for adsorbing carbon dioxide in series with and following a dehumidifying rotor. This arrangement is necessitated by the teaching that adsorbents useful for capturing carbon dioxide will preferentially adsorb water. There is no suggestion by these references that the use of several rotors of the same type when placed in series will produce an extremely pure gas.

Claim 39 is rejected under 35 U.S.C. §103(a) over Onitsuka et al. in view of Izumo. Claims 40-42 are rejected under 35 U.S.C. §103(a) as unpatentable over Onitsuka et al. in view of Izumo and further in view of Suzuki et al. Claim 55 is rejected under 35 U.S.C. §103(a) as unpatentable over Izumo in view of Suzuki et al.). The Izumo patent relates to a rotary adsorbent apparatus for removing solvents from air to prevent these solvents from being released into the atmosphere. Nowhere in the patent is it suggested that this apparatus could be used to produce a purified compressed gas stream as is produced and claimed in the present invention. There is only the disclosure of a blower 11 at the end of Izumo's purified air stream which is employed to handle any pressure drop across the damper to close off the system. All of the cited claims require compression of the purified gas stream which is outside the teachings of Izumo.

The Examiner is invited to contact the undersigned representative if there are any questions regarding this response or if there are any other issues to resolve concerning this patent application.

Respectfully submitted,



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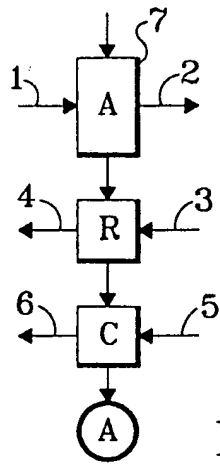


Fig. 1

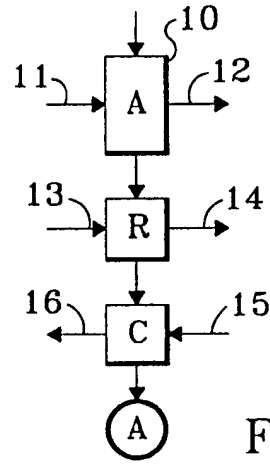


Fig. 2

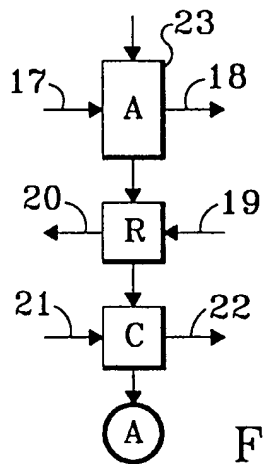


Fig. 3

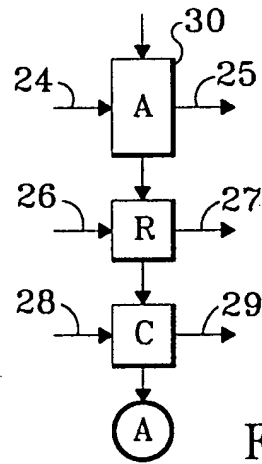


Fig. 4

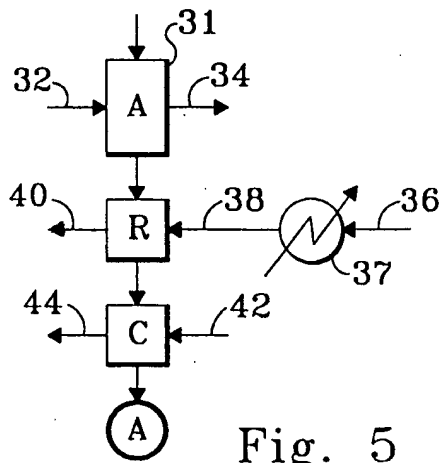


Fig. 5

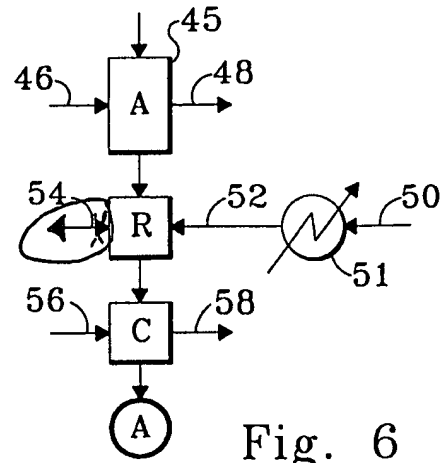


Fig. 6